

AMENDMENTS TO THE SPECIFICATION:

Please add the following new paragraphs after the paragraph at page 6, lines 3-15:

In some embodiments, provided is a method of preparing a ceria based electrolyte with a density greater than 97% of the theoretical achievable density, the method comprising; providing a ceria based electrolyte and sintering the electrolyte at 1200°C or less such that the concentration of divalent cations minus the adjusted concentration of trivalent cations in the sintered electrolyte is between 0.01 mole % and 0.1 mole %. In some embodiments, the conditions of the sintering process are controlled to reduce at least some trivalent cations in the electrolyte into divalent cations. In some embodiments, the conditions of the sintering process are controlled to produce a suitable oxygen or water pressure to reduce a suitable amount of trivalent cations into divalent cations.

In some embodiments, the electrolyte is provided on a substrate and the substrate material is selected to produce the required concentration of divalent cations minus the adjusted concentration of trivalent cations in the electrolyte. In some embodiments, an electrode is provided between the electrolyte and the substrate.

In some embodiments, divalent cations are added to the electrolyte before or during the sintering process.

In some embodiments, the concentration of divalent cations minus the adjusted concentration of trivalent cations in the sintered electrolyte is between 0.02

mole % and 0.09 mole % inclusive. In some embodiments, the concentration of divalent cations minus the adjusted concentration of trivalent cations in the sintered electrolyte is between 0.03 mole % and 0.08 mole % inclusive.

In some embodiments, the concentration of trivalent cations is adjusted by multiplication by a number between 5 and 10.

In some embodiments, the electrolyte is sintered at 1100°C or less. In some embodiments, the electrolyte is sintered at 1050°C or less. In some embodiments, the electrolyte is sintered at 1000°C or less.

In some embodiments, the electrolyte is provided as a thick film.